



Serbia & Montenegro Armed Forces



Naval Hydrographic Institute



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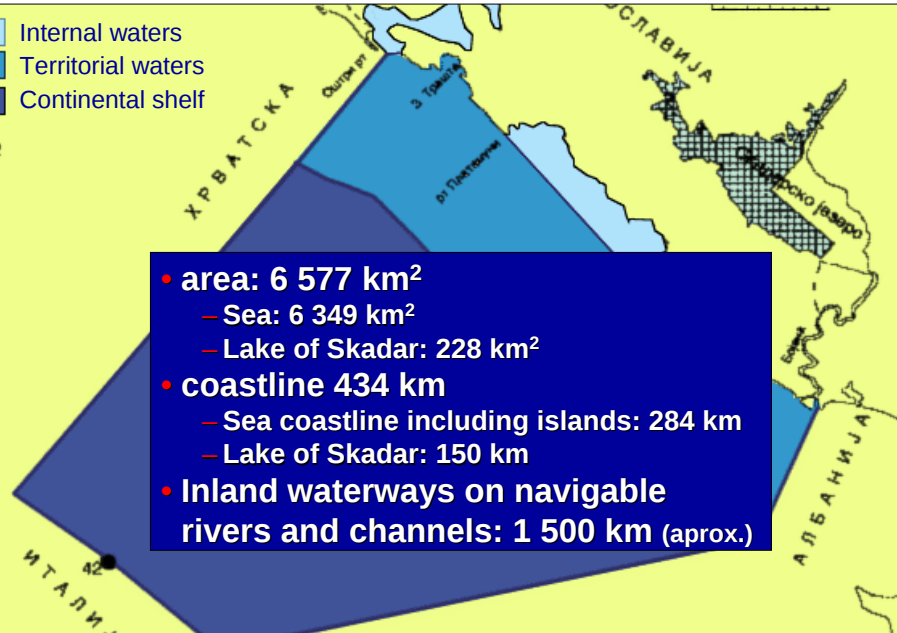
State Union of Serbia & Montenegro



- consists of Republic of Serbia and Republic of Montenegro
- area: 102 173 km²
- population: 8 000 000 (approx.)



Waters of Serbia & Montenegro

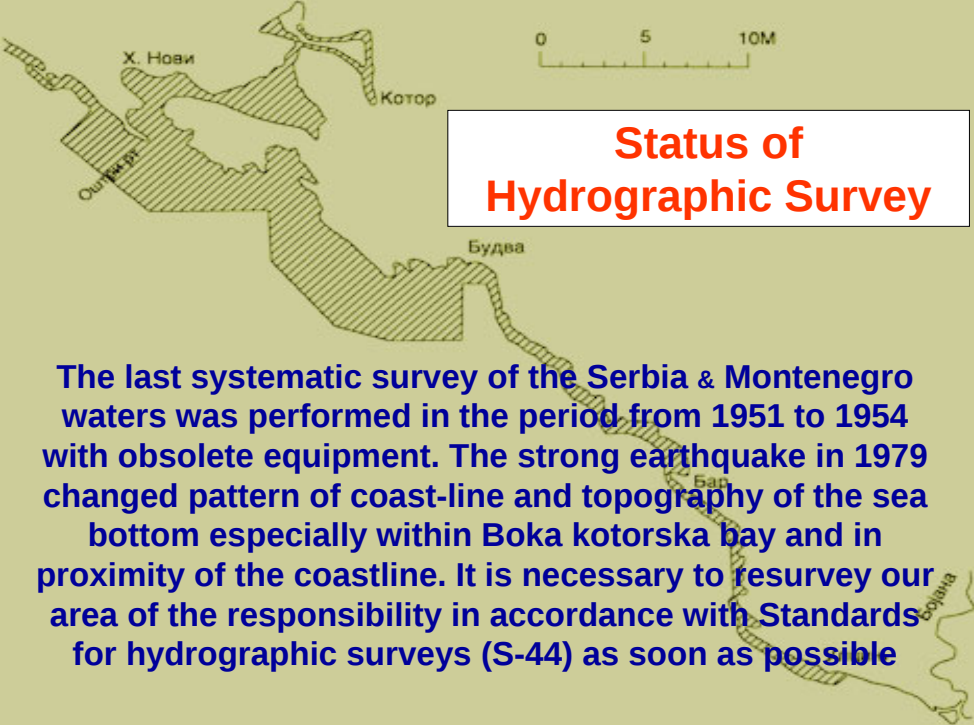
- 
- A map of the Adriatic Sea region showing the waters of Serbia and Montenegro. The map includes labels for neighboring countries: ХРВАТСКА (Croatia) to the north, ИТАЛИЈА (Italy) to the west, АЛБАНИЈА (Albania) to the south, and СЛАВИЈА (Slovenia) to the east. The map also shows the coastline of Montenegro and the Lake of Skadar. A legend in the top left corner identifies three types of waters: Internal waters (light blue), Territorial waters (medium blue), and Continental shelf (dark blue). A scale bar in the top right corner indicates a distance of 42 km. A black dot with the number 42 is located in the bottom left corner of the map.
- Internal waters
 - Territorial waters
 - Continental shelf

- **area: 6 577 km²**
 - Sea: 6 349 km²
 - Lake of Skadar: 228 km²
- **coastline 434 km**
 - Sea coastline including islands: 284 km
 - Lake of Skadar: 150 km
- **Inland waterways on navigable rivers and channels: 1 500 km (aprox.)**



Inland Waterways of Serbia & Montenegro

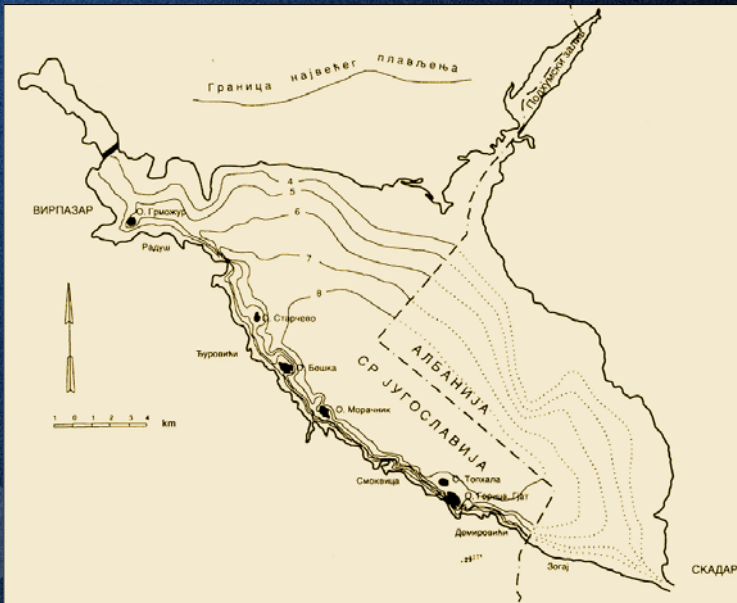






Lake of Skadar Survey

(from 1972 to 1977)





Basic Infrastructure



42°27'50.9"N
018°41'01.6"E
(WGS 84)

The Institute is situated in small village of Lepetane
in Boka kotorska bay





Hydrographic Launch

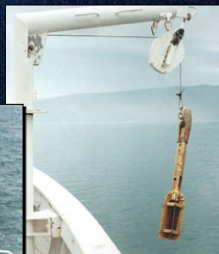
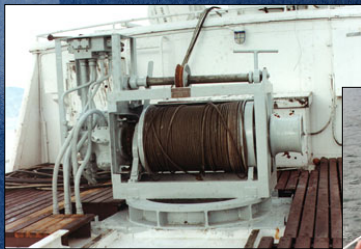


The Institute owns one hydrographic launch:

- displacement: 69 t
- length: 22.5 m
- draft: 1.9 m
- speed: 8 / 10.5 knots
- accommodation capacities
 - 8 crew members
 - 4 members of hydrographic team

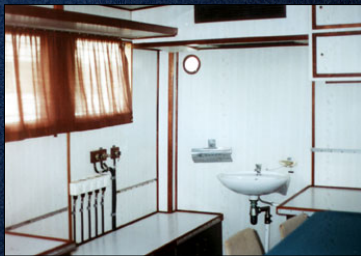


Hydrographic Launch



- equipped with special purpose winches (150 and 300 kg)
- have various equipment and "A" frame for lowering and towing instruments
- provide AC and DC power supplies of various voltage

Hydrographic Launch



- laboratory can serve as dry as well as wet one
- provide protection of instruments in all meteorological conditions



Hydrographic Boat

Institute owns one hydrographic boat:

- displacement: 6 t
- length: 9 m
- draft: 0.5 m
- accommodation capacities:
 - 2 crew members
 - 2 members of hydrographic team
- echo sounder transducers are installed
- AC and DC power supplies are provided

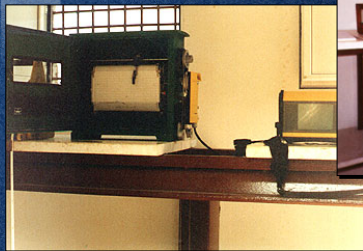


Permanent Tide Gauge Station in Dobra Luka Bay



- operating from September 2000
- equipped with a modern tide gauges, suitable for analog and digital recording
- a barograph and anemograph are also installed

Tide Gauge Configuration



- Tide gauge "R 20", float operated, measures with millimeter precision
- "Thales" Intelligent Shaft Encoder with integral datalogger, with a memory circuit board of 32 KB for recording of 11 200 measured values
- Multifunctional operating unit VOTA with software for data transferring
- Software "Hydras", with possibility of manual and automatic data recording, multifunctional graphics, graphical and numerical data display



Survey Configuration

The Institute possess basic survey equipment:

- portable and hull mounted single beam echosounders
- CTD probe
- DGPS receiver Trimble Pathfinder ProXRS
- Leica TCR 702 Total Station
- Trimble hydro-navigational and data processing software





Data Processing Equipment

Hardware

- 5 working stations
- 1 file server
- 2 notebooks
- 1 large format color printer
- A4 format scanners, laser printers ...



Software

- Intergraph GeoMedia Professional GIS
- Trimble HydroPro hydrographic software
- GPS Trimble Pathfinder Office
- Trimble Terramodel 3D modeling and contouring software
- HYDRAS III hydrological software
- Foreman's software for tide analysis and prediction





Production Lines



Existing paper charts



Hydrographic survey



Sensors:
tide gauge, DGPS, ...



External sources:
NAVTEX and GMDSS,
reports, corrections,
foreign nautical charts and
nautical publications,
international agreements ...

Digitization

**Data
validation**

**Format
adaptation**

**OCR
or manual
editing**

**Marine
GIS**



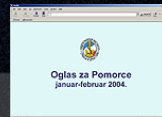
New paper charts



ENC



Classical nautical publication:
NtM, List of Lights ...



Nautical
e-publications:
WWW, e-mail





Hydrographic Survey





Data Processing

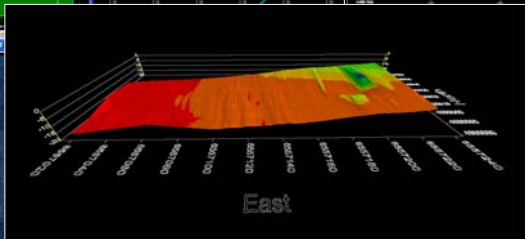
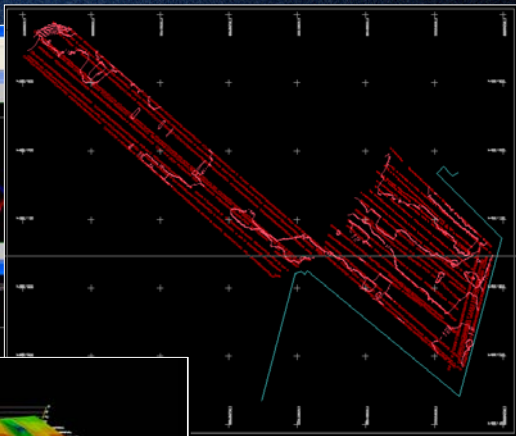
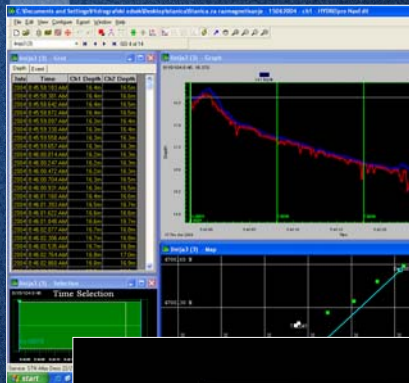


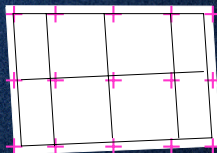
Chart Digitization



Paper chart



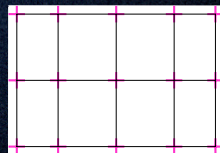
Scanning



Raster picture



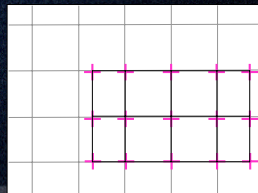
Normalization



Raster chart



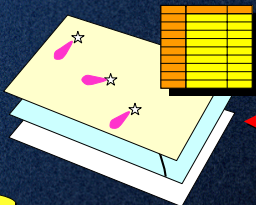
Geo-referencing



Geo-referenced raster chart



Vectorization

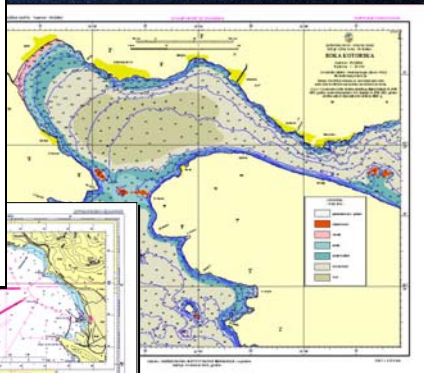
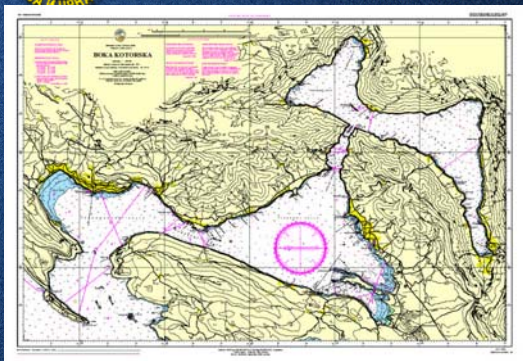


Marine
GIS





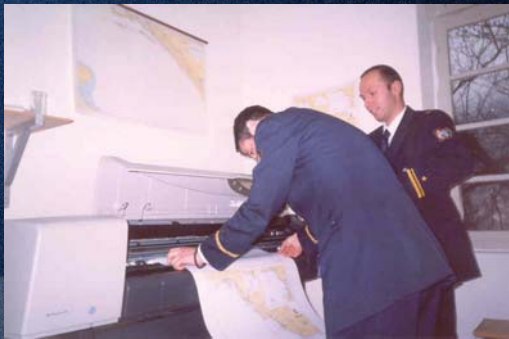
PoD - Print on Demand





PoD - Print on Demand

- computer supported chart update
- only necessary quantities of charts are printed
- drop in chart update costs





Hydrographic Community Activities



- international and bilateral meetings
- education at IMO IMA
- joint projects with local educational and scientific institutions



**WELCOME
ABOARD**



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